ABSTRACT

A telemetry system includes many radio transmitters using frequency hopping carriers to intermittently transmit transmissions indicative of status of sensors associated with the transmitters. The transmitters transmit transmissions independently of a receiver receiving the transmissions and

5   independently of each other. The carrier frequency and the time between transmissions are changed according to a frequency-time hopping sequence that is different for each transmitter. The sequences and the resulting frequency ad time hopping are predictable and can be reproduced in the receiver based on the transmitter ID number. The system also includes one or more receivers containing a plurality of memory registers to hold, simultaneously for each transmitter, digital data indicative of (a) expected time and (b)

10   expected frequency of the next transmission occurrence. The data is updated based on the time and the content of the received transmissions. The receiver authenticates the received transmissions by discriminating transmissions received at a wrong frequency and time. In addition, each transmitter encrypts the transmission using a variable encryption key that is varied with each transmission. The key variations are based on the frequency and time hopping sequence and are different for each transmitter.

15   Alternatively, prior to encryption, each transmitter modifies data for transmission, using a modifier that is varied based on the frequency and time hopping sequence that is different for each transmitter. In addition, for faster acquisition and robust operation, the receiver includes and RSSI circuit based on FFT to detect transmitted carrier power at several different frequencies. The receiver also includes one or more frequency selective circuits that are tuned in response to the outputs from FFT and the status of the time and

20   frequency registers.